# Development of Geo-simulator using 3D Solid Model and Computer Projector


- Makoto Watanabe, HCC, Japan
- Shunji Murai, Univ. of Tokyo, Japan
- Yousuke Seki, HCC, Japan



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# Outline of Presentation

- Introduction
- 3D Solid Model
- Projection of GIS Data
- Applications of Geo-simulator
- Conclusions

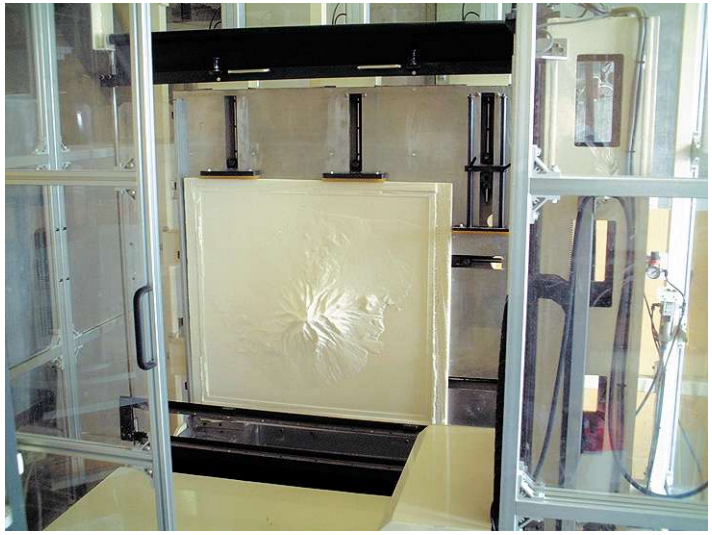
# Introduction

- A real solid 3D model is much better than 3D bird’s eye view on a computer monitor
- But, color painting of 3D solid model was expensive and time consuming
- A LCD projector will solve the problem

# 3D Solid Model

- A numerical control (NC) machine cuts a white plastic board according to DEM
- The size of a board is 100cmx120cm in area and 10cm in height
- Cutting accuracy will be around 1mm

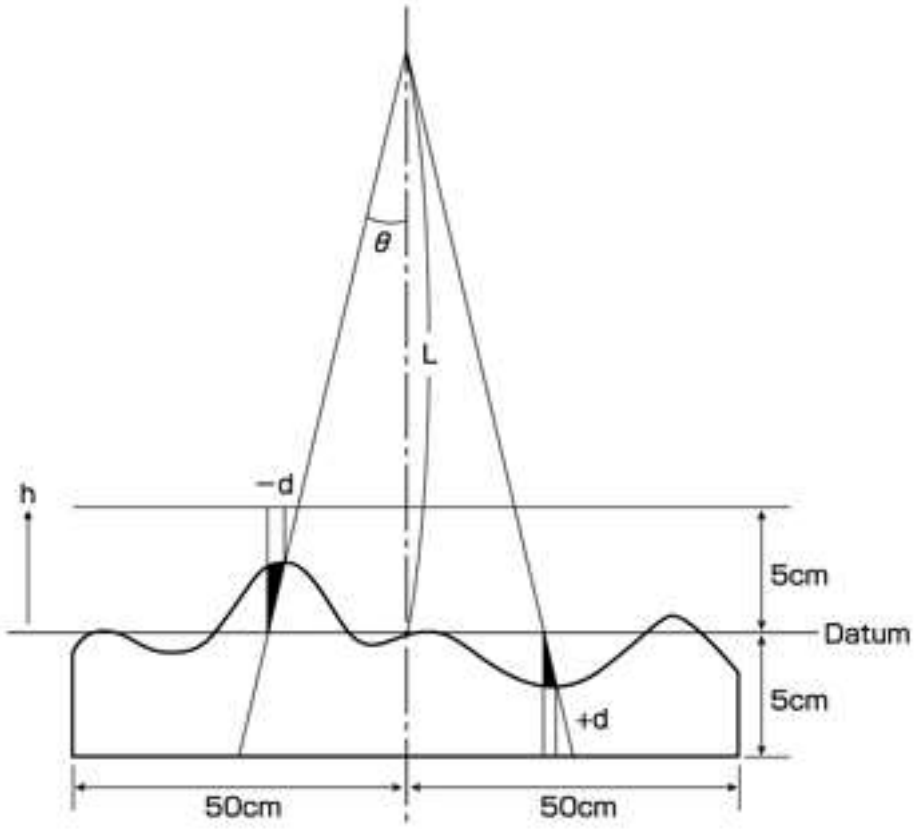
# NC Machine and 3D Solid Model



# Geometric Problem of LCD Projector

- A LCD projector converts 2D GIS data to a central projection
- As 3D solid model is based on ortho-coordinate system, the projected image results in somewhat displacement depending on DEM

# Displacement



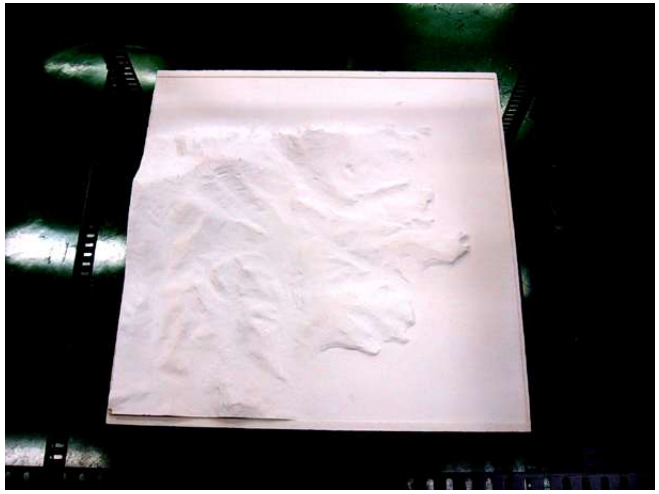
# Required Distance between LCD Projector and 3D Solid Model

- As a test result, displacement of less than 5mm is acceptable on a model
- If the datum is taken on the middle plane, the distance should be more than 5m
- The view angle should be less than 11.4 degree

# Test Sample of 3D Solid Model

- Test Area: Daisetsu-zan Area, Hokkaido, Japan
- DEM used: 10m grid; max.H=2290m
- LCD used: EPSON

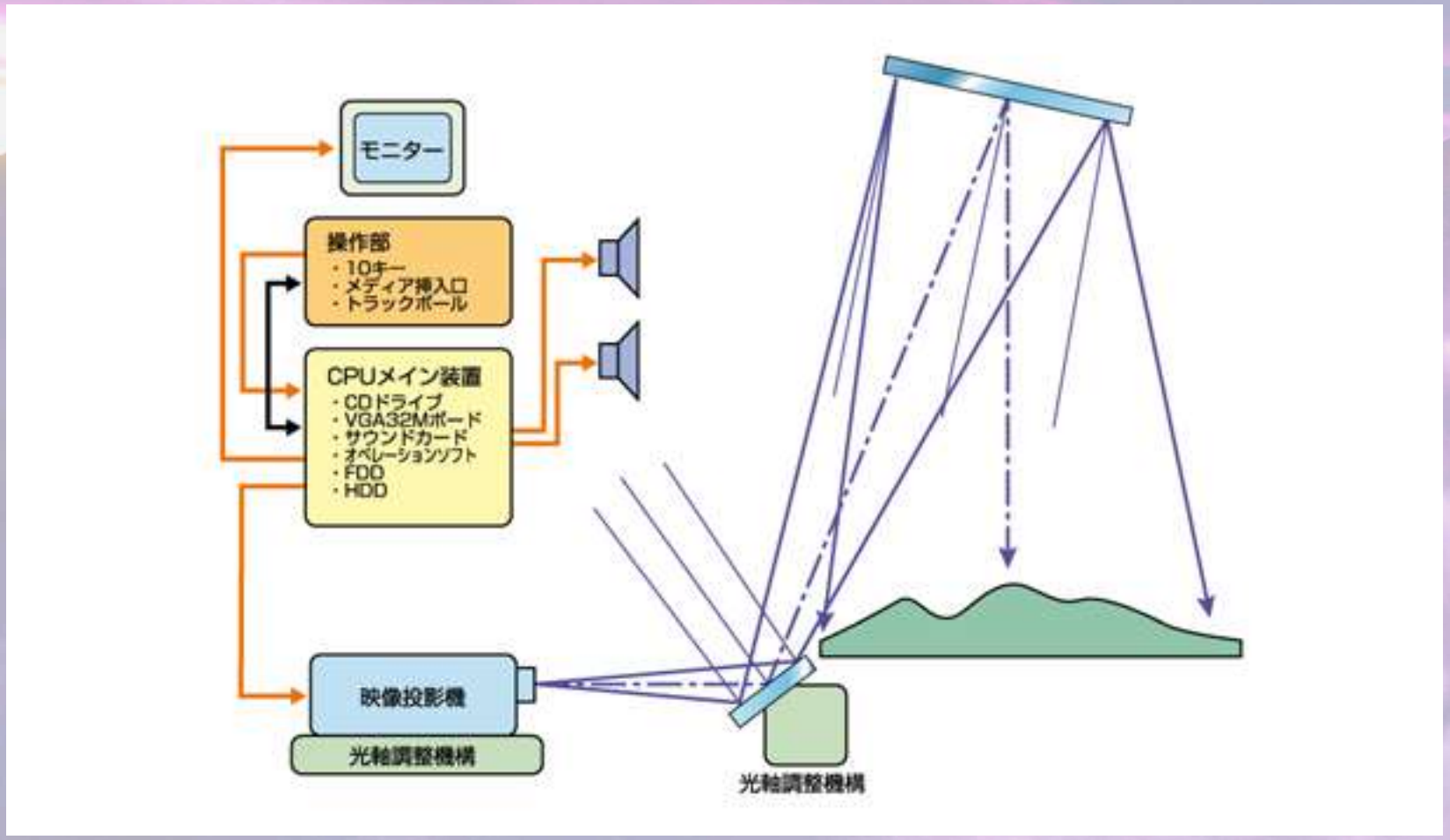
# Experimental Geo-simulator



# Projection of GIS Data onto 3D Model

- Level sliced color DEM
- Route location of a designed road
- Simulation of snow fall

# Proposed Design of a Geo-simulator



# Human Face Model with Geo-simulator

# Conclusions

- Geo-simulator is a powerful tool for a real 3D visualization
- The biggest advantage of Geo-simulator is that arbitrary 2D GIS data or images can be projected onto a 3D model by a LCD projector